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Argonne National Laboratory, Louisiana Universities Find Common Ground

Opportunities for expanded high-tech research collaboration between Louisiana's research universities and the U.S. Department of Energy's renowned Argonne National Laboratory were the topic of discussion at a workshop held in Baton Rouge on February 12. The all-day event was hosted and organized by the Louisiana Board of Regents and Louisiana EPSCoR (Experimental Program to Stimulate Cooperative Research), a federal and state partnership program under oversight of the Regents designed to build and expand the state's science and engineering research, education and technology capabilities.

The idea behind the workshop was to facilitate interaction among Argonne's scientists and researchers from Louisiana universities to identify opportunities for research collaboration in the exciting and growing fields of micro- and nano-technology. Like Argonne, several Louisiana institutions are conducting groundbreaking research in the field of nano-technolgy, which deals with the development and manufacture of devices with feature sizes as small as one-billionth of a meter. This technology, which has applications in such fields as medicine, chemical manufacturing and national defense, has been identified by the federal government as "one of the five technologies that will determine economic development in the 21st century."

"The name of the game at this event is 'networking,'" said Louisiana EPSCoR Director Dr. Michael Khonsari. "It is crucial for researchers to stay abreast of what's available on both the state side and the federal side. There are several areas where our research in Louisiana overlaps with what's going on at Argonne, and this workshop should foster some valuable synergies."

The workshop kicked off with presentations on specific projects underway at Argonne and in Louisiana. Dr. Eric Isaacs, Director of Argonne's Center for Nanoscale Materials (to be operational by 2006), used the opportunity to enlighten attendees on the research focuses and capabilities of the $72 million facility, one of five such centers nationwide, funded through a partnership between the federal government and the state of Illinois.

"The Center is devoted to tackling the grand challenges of nanoscience," said Isaacs. Among those challenges, Isaacs said, are the transformation of the *art* of nano-device fabrication into a true *science*, understanding the limits of miniaturization and laying the foundation for new technologies based on nanoscience.

Argonne National Laboratory
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In his presentation, Isaacs highlighted, among other innovations, the Center's capabilities in "focused ion beam" technology, a key fabrication tool for nano-scale materials that provides unique capability for nano-scale milling, and in "X-ray nano-probe" technology, which allows direct close observation of individual nano-structures. Among the specific technological marvels Isaacs enumerated as conceivable through the Center's nano-technology research is an artificial retina, which would make use of "nano-crystalline diamond electrodes."

"Our technical capabilities have many applications to the research being conducted in Louisiana," said Isaacs. "We want to work with [Louisiana] to define what the scientific future of nano-technology should be."

Regarding Louisiana's nano-technology research, presentations followed on the work of the state's nine-university Consortium for Micro-Nano Technologies for Advanced Physical, Chemical and Biological Sensors. Dr. Kevin Stokes, of the University of New Orleans (UNO) Advanced Materials Research Institute, presented the work of the Consortium's Nanomaterials Team, which includes researchers from LSU A&M, Louisiana Tech, Southern University A&M, Tulane and UNO. The team is conducting research in several areas which have important ramifications in biotechnology, with strong possibilities for commercial applications.

Dr. Kody Varahramyan, Director of Louisiana Tech's Institute for Micromanufacturing, shared the work of the Consortium Microfabrication Team, composed of researchers from Louisiana Tech, Grambling, Tulane, the University of Louisiana at Monroe, UNO, Xavier and LSU's J. Bennett Johnston Center for Advanced Microstructures and Devices (CAMD). The team's research has focused on developing cutting-edge micro- and nano-fabrication techniques that will contribute to the growing need for sound manufacturing technologies.

The research of the Consortium's Neural Signaling Team was presented by Dr. Elena B. Rodriguez de Turco and Dr. Mark DeCoster of the LSU Health Sciences Center (LSUHSC) Neuroscience Center of Excellence in New Orleans. The team, which includes researchers from LSUHSC and Xavier University, is engaged in research focused on Alzheimer's disease and memory, and the potentially-blinding maladies of macular degeneration and retinitis pigmentosa.

There were also three addtional presentations on related research in Louisiana. Dr. Robin McCarley acquainted the group with the research being conducted at LSU's Center for Biological Modular Microsystems, Dr. Josef Hormes highlighted research at LSU's CAMD, and Dr. Gary Glass, Director of the Louisiana Accelerator Center at the University of Louisiana at Lafayette, covered that facility's applicable work in the realm of nano-science.

The workshop also included a "working lunch," where attendees were provided the opportunity to exchange ideas in an informal setting, and an afternoon round of discussions and networking opportunities.

"The potential of this sort of research is nearly limitless, and the implications for human progress and economic development are far-reaching," said Commissioner of Higher Education E. Joseph Savoie. "It's exciting that Louisiana's universities are playing such a significant role in the advancement

of micro- and nano-technology. The prospect of expanded collaboration with an institution as prestigious as the Argonne National Laboratory speaks well of the reputation of our researchers."